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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/648,403	08/24/2000	Richard H. Tsai	08305/076001/99-29	5841

7590 01/20/2004

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EXAMINER

VU, NGOC YEN T

ART UNIT	PAPER NUMBER
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2612

DATE MAILED: 01/20/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/648,403

Applicant(s)

TSAI, RICHARD H.

Examiner

Ngoc-Yen T. Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

I. Claims 1-3 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Akagawa et al. (US #5,757,008)

Regarding claim 1, Akagawa '008 teaches a pixel sensor (Figs. 13-15) for providing image sensing under radiation, comprising a readout circuit operating to convert optical image signals to electronic signals, wherein said readout circuit includes p-type transistors (11-14) and n-type photosensitive element (col. 21 line 65 – col. 22 line 17); and a first reset circuit (51-54) configured to reset level for a pixel output, where said first reset circuit includes at least one p-type transistor, where said readout circuit and said first reset circuit provide radiation hardness without any radiation protective enclosure (col. 21 line 65 – col. 22 line 62).

As to claim 2, Akagawa teaches that said p-type transistors are MOSFET p-type transistors (col. 22 lines 1-34)

As to claim 3, Akagawa teaches that said n-type photosensitive element is an n-type photodiode (col. 22 lines 8-12).

Regarding claim 14, Akagawa '008 teaches a CMOS image sensor system (Figs. 13-15), comprising:

an array of active pixel sensors, each pixel sensor of said array including a pixel readout circuit operating to convert optical image signals to electronic signals, wherein said readout circuit includes p-type transistors (11-14) and n-type photosensitive element (col. 21 line 65 – col. 22 line 17); and a first reset circuit (51-54) configured to reset level for a pixel output, where said first reset circuit includes at least one p-type transistor, where said pixel readout circuit and said first reset circuit provide radiation hardness without any radiation protective enclosure (col. 21 line 65 – col. 22 line 62);

a control circuit (31-32) configured to provide timing and control signals to enable readout of data stored in said array of active pixel sensors (col. 21 line 65 – col. 25 line 59);

a column readout circuit (Fig. 4, circuit 128) operating to receive and process said data stored in said array of active pixel sensors.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akagawa '008 in view of Chou (US #6,252,218).

As to claims 4-5, the claims differ from Akagawa in that the claims further require the photodiode is formed in a square layout design or a circular layout design. However, Chou' 218 teaches an active image sensor in which photodiodes are laid out in a geometrically-efficient pattern for the purpose of increasing pixel density and pixel resolution while reducing noise and crosstalk (see Figs. 6, 7, 9 and 11; col. 4 lines 9-43). In light of the teaching from Chou, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the photodiodes as claimed in claims 4 and 5 so as to increasing pixel density and pixel resolution while reducing noise and crosstalk.

3. Claims 6-8, 10-12, 15, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akagawa '008 in view of Yang (US #5,372,955).

As to claims 6 and 8, the claim differs from Akagawa in that the claim further requires a p-type substrate on which said n-type photosensitive element is formed and the n-type well connected to a supply voltage and operating to prevent crosstalk between pixels. However, Yang '955 teaches a p-type substrate (50) on which an n-type well (63) is formed (see Fig. 8). In light of the teaching in Yang, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the n-type photosensitive element taught in Akagawa in a p-type substrate as claimed. Official notice is taken that it is well known in the art to connect a photosensitive element to a supply voltage in order to prevent crosstalk between the photosensitive elements.

As to claim 7, Akagawa, as modified by Yang, teaches a pair of p⁺ type guard rings formed on said p-type substrate, each of said guard rings formed on either side of said n-type

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photosensitive element (Akagawa, see Figs. 7 and 9-11) (Yang, Fig. 8, col. 1 lines 33-37, col. 2 lines 43-45). Official notice is taken that it is well known in the art to connect guard rings to a ground voltage to reduce a leakage current from the photosensitive element.

Regarding claim 10, the limitation in claim 10 can be found in claims 1-3 and 6.

As to claim 11, the limitation in claim 11 can be found in claim 7.

As to claim 12, the limitation in claim 12 can be found in claim 8.

As to claim 15, the limitation in claim 15 can be found in claim 6.

As to claim 16, the limitation in claim 16 can be found in claim 7.

As to claim 17, the limitation in claim 17 can be found in claim 8.

4. Claims 9, 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akagawa '008 in view of Guidash (US #5,881,184).

As to claim 9, the claim differs from Akagawa in that the claim further requires a second reset circuit having a p-type MOSFET transistor coupled to an input of said first reset circuit, said second reset circuit allows pixel-by-pixel reset operation. However, it is well known in the art to provide a solid state image sensor with reset means which is capable of reset all pixels simultaneously as well as a pixel at a time, as taught in Guidash '184 (see Fig. 2A, col. 3 line 64 – col. 4 line 42). In light of the teaching in Guidash, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the image sensor taught in Akagawa with a second reset circuit having a p-type MOSFET transistor coupled to an input of said first reset circuit so as to allow all the pixels to be reset simultaneously as well as a pixel at a time.

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As to claim **13**, the limitation in claim 13 can be found in claim 9.

As to claim **18**, the limitation in claim 18 can be found in claim 9.

Conclusion

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen T. Vu whose telephone number is 703-305-4946. The examiner can normally be reached on Mon. – Fri. from 8:00 am to 4:40 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R. Garber can be reached on 703-305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.



NGOC-YEN VU
PRIMARY EXAMINER

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NYV
01/09/2004